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AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS NOTTINGHAMSHIRE MINERALS PLAN SITE 13, BANTY COCK

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS

NOTTINGHAMSHIRE MINERALS PLAN
SITE 13, BANTY COCK

1.0 BACKGROUND

1.1 The site, an area of 147.8 hectares, forms part of the Nottinghamshire Minerals Plan. ADAS Statutory Unit, Cambridge surveyed the site for MAFF in November 1992 to assess the agricultural land quality and soil physical characteristics.

1.2 On the published Agricultural Land Classification (ALC) map sheet No. 113 (Provisional, Scale 1:63,360, MAFF 1974), the site is shown as grade 3. The current survey was undertaken to provide a more detailed ALC of the site.

1.3 Auger boring observations were supplemented by observations from two soil pits. At the time of survey the land was under cereals, oil seed rape and grass.

2.0 SITE PHYSICAL FACTORS

Climate

2.1 Climate data for the site was obtained from the published agricultural climatic dataset (Met Office, 1989). This indicates that the annual average rainfall for the site is 570 mm (22.4"). This data also shows that field capacity days are 110.

2.2 The accumulated temperature for this area is approximately 1426 Day degrees Celsius. This parameter indicates the cumulative build-up of warmth available for crop growth and in conjunction with rainfall has an influence on the development of soil moisture deficits (SMD)* and susceptibility to drought; soil

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* SMD represents the balance between rainfall and potential evapotranspiration occurring during the growing season. For ALC purposes the soil moisture deficits developing under a winter wheat and maincrop potato cover are considered. These 'reference' crops have been selected because they are widely grown, and in terms of their susceptibility to drought, are representative of a wide range of crops.

moisture deficits of 119 mm and 114 mm are recorded for wheat and potatoes respectively.

2.3 These climatic characteristics do not impose a limitation on ALC grade.

Altitude and Relief

2.4 The site covers a large, virtually level area to the north of Bennington Fen at approximately 15 m AOD. Neither gradient nor altitude are limitations to the ALC grade.

3.0 AGRICULTURAL LAND CLASSIFICATION (refer to ALC map)

3.1 The definitions of the Agricultural Land Classification (ALC) grades are included in Appendix 1.

3.2 The survey area comprises mainly 3b land with a smaller area of 3a adjacent to the northern edge (slightly higher elevations). The table below shows the breakdown of ALC grades in hectares and percentage terms.

AGRICULTURAL LAND CLASSIFICATION

Grade	ha	%
3a	42.8	29
3b	102.5	69
Non Agricultural	2.5	2
TOTAL	147.8	100

Subgrade 3a

3.3 On the slightly higher land to the north profiles are better drained (typically wetness class II*),the soils are fully described in paragraph 4.4 (soil type 2). Profile pit observations confirm that subsoils are typically slowly permeable at

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* Occasionally profiles have a wetness class of III and are calcareous throughout.

depth. This drainage impedance combined with the relatively heavy, often non calcareous topsoils to impose a moderate wetness and workability restriction on the ALC grade. In smaller, isolated areas where Limestone fragments and rock occur at depth the available water for crop growth is restricted. These profiles are limited to subgrade 3a by droughtiness imperfections.

Subgrade 3b

3.4 At the edge of Bennington Fen, covering the majority of the site, heavy clayey soils predominate. These are described in paragraph 4.3 (soil type 1). Profile pit observations indicate that soils are slowly permeable directly below the topsoil, thus the wetness class has been assessed as III. The combination of heavy topsoil textures (clay content always exceeds 45%) and shallow depth to slow permeability imposes a significant limitation which precludes the land from a higher grade.

Non Agricultural

3.5 Derelict airfield areas have been mapped as Non Agricultural.

4.0 SOIL PHYSICAL CHARACTERISTICS

Geology

4.1 The published 1:50,000 scale solid and drift edition geology sheet 126 (Geological Survey of England and Wales, 1972) shows the area to comprise relatively equal proportions of Lower Lias Shaley Clay with Limestone (north) and alluvium to the south.

Soils

4.2 The current detailed inspection of the site shows two main soil types which are derived from the above geological deposits.

Soil Type 1 (refer to Appendix 2 and Soil Types Map)

4.3 These soils outcrop in association with the alluvium deposits and occupy the majority of the site (typically to the south). Profiles generally comprise heavy clay topsoils over heavy clay subsoils which may overlie Limestone rock at depth (ie 80cms+). Soils are often calcareous throughout the subsoils and tend to be very slightly or slightly calcareous in the topsoil. The calcium carbonate content does little to increase the workability of these soils because the clay content is high and always exceeds 45%.

Soil Type 2 (refer to Appendix 2 and Soil Types Map)

4.4 At the slightly higher elevations to the north better drained, slightly lighter textured profiles outcrop. Topsoils typically comprise very slightly to slightly calcareous medium clays or heavy clay loams with a stone content range of 3 to 5% (flints and Limestones). Subsoils are clayey and calcareous and may merge into Limestone rock at depth (70/80 cms+). Subsoils tend to be very slightly to slightly stony (5 to 15%), although occasional narrow, moderately or very stony lenses are present. The stones tend to be Limestones, although flints were also noted.

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Appendix 1

Grade 1 - excellent quality agricultural land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly include top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 - very good quality agricultural land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable crops. The level of yields is generally high but may be lower or more variable than Grade 1.

Grade 3 - good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a - good quality agricultural land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Subgrade 3b - moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of winter range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 - poor quality agricultural land

Land with severe limitations which significantly restrict the range of crops and/or levels of yields. It is mainly suited to grass with occasional arable crops (eg. cereals and forage crops) the yield of which are variable. In most climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 - very poor quality agricultural land

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

Appendix 2

DESCRIPTION OF SOIL PHYSICAL CHARACTERISTICS

NOTTINGHAMSHIRE MINERAL PLAN

SITE 13, BANTY COCK

SOIL TYPE 1 (103.2 hectares)

Topsoil	Texture	:	heavy clay
	Calcareous	:	yes, slightly or very slightly
	Depth	:	30cm
Subsoil	Texture	:	heavy clay
	Structure	:	weakly developed very coarse subangular blocky, tending to massive
	Calcareous	:	yes
	Consistence	:	firm
	Gleying	:	yes
	Stone	:	2 to 3% Limestones and flints
	Depth	:	80/120 cm (depends on presence of Limestone rock).

Parent Material: Platy Limestone fragments (>70%) in a clay loam matrix with rooting evident through the soil material. Identified as Limestone rock. The soil horizon immediately above this layer may be slightly (10-15%) stony.

SOIL TYPE 2 (44.6 hectares)

Topsoil	Texture	:	heavy clay loam or medium clay
	Calcareous	:	yes, very slightly or slightly
	Stone	:	very slightly stony (3-5%), typically Limestone.
	Depth	:	30 cm, occasionally 35 cm
Upper Subsoil	Texture	:	medium clay
	Structure	:	moderately developed coarse subangular blocky.
	Consistence	:	firm
	Calcareous	:	yes
	Gleying	:	no
	Stone	:	5 to 15% typically Limestone, some flints.
	Depth	:	55 cm, occasionally 50 cm

Lower Subsoil	Texture	:	medium or heavy clay
	Structure	:	moderately developed coarse angular blocky
	Consistence	:	firm
	Calcareous	:	yes
	Gleying	:	yes
	Stone	:	10 to 15% Limestones, some flints (occasionally <10% stone).
	Depth	:	70/120 cm (depends upon the presence of Limestone rock).

Parent Material: Platy Limestone fragments (>70%) in a clay loam matrix with rooting evident through the soil material. Identified as Limestone rock.

Additional Information

Rooting: Rooting is evident throughout all profiles.

Drainage Status: Dependent on the depth to the slowly permeable layer. Typically wetness class II in Soil Type 2 and wetness class III in Soil Type 1.

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND & WALES, 1972. Solid and Drift edition geology sheet 126. 1:50,000 scale.

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BANTY COCK

MAP 1: AGRICULTURAL LAND CLASSIFICATION
MAP 2: SOIL TYPES